TRI-CITIES DIOXIN COMMUNITY MEETING

August 7, 2008

6:30 - 9:30 p.m.

Horizons Center, 6200 State Street, Saginaw

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CHUCK NELSON: Well, I'd like to welcome you all to the community meeting regarding historic dioxin contamination. Today I'm a little frazzled. I apologize. I just came from a funeral in Brighton where I had to speak about a person I had known for a while and sadly passed away. I'd like to call your attention to the ground rules and have you note that we work diligently to give everyone an opportunity to have their say and to show respect to all presenters and questioners. I will do my utmost to keep us on time so the public gets their full opportunity from 8:10 on to ask questions of any of the presenters and any of the agencies or entities present.

We will have typically opportunities for a couple of clarification questions directly following a presentation, but more complex questions that are going to involve some detailed answers, perhaps some comment, rebuttal, et cetera, might be best saved for the ending segment where the public asks questions and has discussions. I would also call to your attention that all the parties will be here from 9:00 to 9:30 to spend time with you if you have individual or more detailed questions or want to follow up on something, so all the entities and agencies will be happen to do

that. Now I think we'll have -- there are posters up. Please be sure to visit the tables. What I'd like to do now is we'll have Jim Sygo introduce the folks that are here from the MDEQ and some of the other agencies and then we'll turn to John Musser from Dow and they can talk about their folks.

JIM SYGO: Thank you everybody for coming today. It's a pretty nice day out anyway, a little rain on and off. Let me do this very quickly. Can we get DEQ staff to stand up first, and as I name your name, just feel free to sit down. George Bruchmann is with us, Chief of Waste and Hazardous Materials Division; De Montgomery, Chief of our Hazardous Waste Section; Al Taylor, the geologist on this project; Dr. Deb MacKenzie-Taylor, our toxicologist; Cheryl Howe is in the back of the room greeting people, along with Trisha Peters; and from Community Health, Kory Groetsch and Linda Dykema are at the back of the room. There's nobody from the Trustees today from our Natural Resource Damage Trustees.

And from EPA today, can we get the EPA people to stand up, we have Jason El-Zein, Greg Rudloff, John Steketee, Mario Mangino, Jeff Kimble, Brian Schlieger, Rafael Gonzalez in the back, Nick Hans, Patricia Krause, Keith Budinski and Jeff Kelly. Did I miss

anyone? Okay. John, we'll kick it over to you.

JOHN MUSSER: Having done this poorly before in the past, let me just ask the Dow people and our consultants to please stand up and we'll just go around the room and introduce yourself to the crowd.

JIM COLLINS: Jim Collins, epidemiologist for Dow.

RYAN HOLEM: Ryan Holem, ENTRIX on behalf of Dow.

RICH HUBNER: Rich Hubner with the Sapphire Group on behalf of Dow.

PETER SIMON: Peter Simon, Ann Arbor Technical Services.

LISA YOST: Lisa Yost with ~~ENTRIX~~Exponent.

LESA ALYWARD: Lesa Alyward with Summit.

BOB BUDINSKY: Bob Budinsky, toxicologist with Dow.

GREG COCHRAN: Greg Cochran, Dow Chemical.

DENISE KAY: Denise Kay with ENTRIX on the Ecological Risk Assessment on behalf of Dow.

TODD KONECHNE: Todd Konechne with Dow.

STEVE LINDSTROM: Steve Lindstrom with Dow.

SEAN ROARK: Sean Roark, ENTRIX.

MIKE CARSON: Mike Carson, Dow physician.

PAUL PRICE: Paul Price, Risk Assessment

with Dow.

JACK ZABIK: Jack Zabik, Risk Assessment with Dow.

JOHN MUSSER: And I'll risk it, I'm John Musser, Public Affairs, Dow. Thank you.

CHUCK NELSON: Okay. Our first presentation will be concerning DEQ's notice of Dow requiring 2008 interim response activities and pilot corrective action plans. Al.

AL TAYLOR: Good evening. My name is Al Taylor. I'm a geologist with the Michigan Department of Environmental Quality and I'm one of the assigned project staff on the Dow Chemical offset corrective action program and the onset corrective action program. We've got a number of slides here to go through, some of which you've seen before, so I'm going to go through those relatively quickly.

Kind of a new slide. We have kind of what our current, what we call rosetta stone, slide is here of all the different activities that are ongoing on the Tittabawassee River and on the Saginaw River, so I'll be referring back to this slide a few times during the talk tonight, and I think the thing to take away here is, if you notice in the upstream portion of the watershed where Dow Chemical is over in here, there is

a tremendous amount of activity going on in the upstream portion of the watershed. These dots all represent samples that Dow has collected through their GeoMorph program. You can see they're kind of aligned as transects.

There are a number of investigation focus areas identified, like the H-12 outfall that we'll talk about in a little bit, the EPA area of concerns, some exposure unit sampling that we'll get to a little bit more later, and just to try to give you an idea of kind of where we are right now overall. This also identifies the Upper, the Middle and the Lower portions of the Tittabawassee River. Dow is in the process of collecting samples in the Lower portion of the Tittabawassee River floodplain and also in-channel throughout most of the middle section of the river and the lower, and the Dow Chemical remedial investigation workplan for 2008 mainly focuses on the upper part of the Saginaw River, the upper 6 miles.

This is all stuff that you've seen before. I'm not going to dwell too much on it. The one point that I do want to make here that I think probably doesn't get enough focus in these meetings is that it's not just dioxins and furans that we're looking at as part of this investigation. There are a number of other

contaminants that are important in this investigation and we don't want to overlook them in the overall remedial investigation process.

Current activity, obviously, the GeoMorph process is a methodical approach to investigate, and actually, the overall corrective action process is to have a methodical approach to investigate and remediate from source area down to the endpoint of contamination. It utilizes something called interim response activities or interim source control measures as necessary, and Dow has accomplished quite a bit of work under the Part 111 operating license in the past several years.

Current activity, we're going to talk about in a little bit, they're working on the lower 6 miles or the lower portion of the Tittabawassee River as we defined it here. There's quite a bit more in-channel characterization that needs to be completed. It's mainly from about Mile 9 down to Mile 24 that needs to be taken care of. There are some areas in the upper and middle portions of the study area that have not been investigated yet because of property access issues. Additional work is going to be needed to complete this investigation phase. Dow is currently implementing their sampling plan for this year. That was approved on July 10th.

Again we're going to take a look at this map again and we're going to focus up in this area right up in here and talk about IRAs mainly and other IRA type activities, kind of working from upstream to downstream. As you may be aware, MDEQ made a formal determination that some IRAs or interim response activities were required on the Tittabawassee River and notified Dow in a letter of that on April 16th. In accordance with the conditions of their operating license, Dow had an obligation to respond within 60 days by June 16th. We have been going back and forth on the IRA issues. Dow has contested portions of that, but I think in general we typically have been in agreement on technical approaches but not on administrative mechanisms mainly, calling it an IRA versus a feasibility study or something like that. We're trying not to get too hung up on what it's being called. Our focus is on the activities that are occurring and making sure that it's done under an enforceable schedule and has kind of a defined workplan and endpoint to it and a defined schedule.

From the April 16th letter, we talked about Reach D, bank stabilization, a Saginaw River sediment pilot study or sediment trap pilot, excuse me, in-channel deposits on the Tittabawassee River, which is kind of

the last remaining issues that we're working out, but we've been meeting on that as late as today and are hopeful that we've got a potential resolution to that issue, and a utility worker notification, something we call the Miss Dig program, to let people know who are doing utility work or ground penetrations in the area of contamination that contamination is present and what precautions should be taken.

Additional IRAs and/or high priority investigation areas for 2008. Follow up on exposure unit sampling. EPA is going to talk a little bit about that. Jeff Kimble, the on-scene coordinator working on the Riverside Drive project, will bring some more information. Step-out sampling as part of the GeoMorph investigation process will no doubt be part of the IRA process this year. There is something called the Former 47 Building source area IRA, which is a quite recent IRA, and Steve Lucas from Dow Chemical will be providing some information on that. I've got a few slides that I want to show with respect to that because it's important in terms of the overall remediation effort.

An update of the fish and wildgame advisory signage, we'll very briefly discuss that, and something called the H-12 Outfall investigation. H-12

is not currently identified as an IRA but we're bringing it up here because there are certain deposits -- this H-12 is areas along the Dow Plant site which are related to historical discharges from the facility, outfall discharges, discharges from pipes, and there are certain deposits that have the potential that they may need to be addressed as an IRA but we'll see. We'll let the data drive that.

The Former 47 Building area, the 47 Building used to be the Dow administration building for many, many decades. You can see it's located directly across from the Loons Stadium. This is an IRA that we recently received and Dow has been hard at work. It involves chlorine cell waste that was used as river bank stabilization and then some surficial soil contamination. That is in the process of being addressed as an IRA. This gives you an idea of what we're looking at here. This area in here is kind of the riverbank. This is the material that was used kind of as a stabilization historically. Back down here, this is the Dow Plant site down here. This is not the same kind of riprap chlorine cell waste. This is rock and there's a RGIS ground collection system that ends right here.

Just to give you an idea of how this has

progressed, there's been quite a bit that has been removed from the bank. They're doing a good job and this is how it looked a couple of weeks ago. It's obviously been dressed back quite a bit but there's more work that needs to be done up in this area. They've got sod going down over areas that have been controlled. It's nicely fenced off. This gives you an idea of the proximity to the ballpark, so we're actually quite pleased by the way this has been progressing.

These items in here, these rod-like things, are ~~prophetic amulet~~graphitic anode material which we believe represents some of the source materials, the high concentration source material that's responsible for a lot of the furans in particular in sediments and soils and these are part of that rubble lying around the riverbank in the soil. So one of the reasons we really want to show you this is this is the kind of stuff that once it gets into the river and breaks down a bit and grinds up, this is what's causing some of those truly high furan concentrations that we're seeing. Just to give you an idea for scale, that's a geologist's foot right there.

Reach D, we talk about Reach D quite a bit. We're transitioning from the CERCLA removal process

back to the operating license. The CERCLA order, and I think we discussed this last time, we talked about it last time, didn't specifically address other contaminants beyond dioxins and furans. There are other contaminants there that need to be addressed and additional work that is necessary, some further characterization to hopefully cap or otherwise remove or prevent exposure to other contaminants that are present in the Reach D area. This additional characterization is going to include some toxicity testing, cap design as part of an IRA plan which we have in-house.

We're looking at this interim response activity as becoming kind of a final remedy. We'd like this to be -- this is up at the top of the watershed. We really don't think there's any reason why we can't get a final corrective action out of this and continue moving downstream. Right now there's this RGIS upgrade that's currently ongoing in the area which is complicated. There's a lot of stuff happening in this upper section of the river and the RGIS system is quite an important system for keeping contaminated ground water from getting into the system.

The H-12 investigation, this is part of the operating license compliance schedule. It's currently

not an IRA. The H part means high priority, and as you can see, there are at least 12 and I think now 13 different high priority compliance schedule items in the operating license. Then there's medium and there's low and so there's prioritization going on there. This is looking at historic outfall potential areas similar to Reach D. Reach D, there is a historic outfall up here which is believed to be responsible for the accumulation contamination in this area. This is not the only outfall that Dow had. There are quite a few other outfalls and a number of them require some additional investigation to see if other Reach D type actions or something similar to that need to occur. These are adjacent to the plant site. Again we're working upstream to downstream and we think good progress is being made. I think we're going to have some good information to update at the November community meeting, and this just gives you an idea that there are plenty of outfalls along the river historically.

Bank stabilization, eroding banks, we're continuing to move downstream. Anyone who has been to any one of these meetings know that the big deal that we're making out of this is they really have these levee deposits that erode back in the river are a

large problem and one of the more significant problems that need to be solved in the remediation process here. Bank erosion is significant and widespread along the Tittabawassee River and some of these banks contain some of the highest concentration of dioxins and furans.

This is very consistent with MDEQ and EPA guidance to control sources early in the process, and as part of that, this IRA, which we're looking at this as a feasibility study, is to look at some pilot stabilization areas and we got a pilot workplan back in June and it was subsequently approved on July 10th and that work is going to be ongoing over the fall and into early winter and there's going to be lots of monitoring associated with this. There's four pilot stabilization areas and three additional areas which we're just looking at for monitoring at this point.

Just to give you an idea why this is important, here is a cross section across the river. There are high levels right at the bank eroding out -- potentially eroding out. This is Reach M284+00. It has a concentration of 9,000, 14,000, 50,000. This stuff, there's quite a reservoir here, and rivers don't stay in place over time, so they tend to move from side to side and erode that material and get it

back into the water and get it redeposited later on. This is a good example of eroding banks in that area.

This is important as I mentioned before shorelines can move. This is the 1937 shoreline. This is the 2004 shoreline. Obviously, things have moved over and are eroding material because the channel naturally wanders. This is an example of a pilot stabilization area. The red area shows where they have a potential for erosion based on something called a beehive screening value and where not only is erosion potentially high but we have high concentrations of contaminants there. So these are the types of areas that are being focused on first and prioritized first.

Let's move on to in-channel deposits. Considerations that we're looking at, how stable is the deposit, how exposed are the elevated concentrations, is it buried at depth or is it up near the surface where fish and people can get to it, are there uncontrolled sources upstream that make recontamination of the area likely, can it be efficiently removed or controlled now. Sometimes access is a big issue in dealing with these things, and sometimes is probably a misnomer, many times and maybe always access is a big deal, and what additional

information do we need to make a decision about early action.

This is the JK area and this is actually the area that we're still discussing because they have a high concentration at the surface in this area over in here. Now this is the maximum detected concentrations. The next slide I'm going to show you is the surficial concentrations. As you can see, the maximums are quite a bit higher. The red colors, the decreasing warmth colors, are higher concentrations and the greens are lower concentrations, so in general, we've got some lower concentrations on the surface here, but in this area, we have a TEQ of 11,000, so that's the area that we've been discussing.

This is where that area is in relation to the overbank remediation interim response activity that occurred last year, the JK removal action. What we're trying to do here is address surface concentrations that are high in our interim response activities, and at Reach JK, the one that we looked at, we're looking at high levels of TEQ or dioxins and furan, and in this case with JK, immediately below it, there's some parathion that are present, about 30 parts per million, which is a pretty high concentration for parathion. Basically, the strategy is to conduct

additional data to determine and verify the stability of the deposits. Dow is proposing to leave it in place in the short-term. We call this field validation of modeling.

We're going to do some comparison of the channel conditions between 2007 and 2008 looking at bathymetry principally for 2007 and 2008 and then also looking at things called erosion pins and scour chains where actually surveying is conducted on the bottom of the river of a pin that's set or a chain that's placed to see how much scour has occurred or how much deposition has occurred and we'll use this information to determine if more aggressive actions are necessary in the short-term. As I mentioned before, we're still working on a resolution of the JK exposed sediment area, pretty hopeful.

This is Reach L, again maximum concentrations showing with the reds and the oranges and the yellows are high concentrations. The greens are the lower concentrations and the highs are in the tens of thousands of parts per trillion and the dark green is basically less than a hundred parts per trillion, and for this deposit right here, this is an example of scour chains and erosion pins that have been set to monitor these areas.

Residential exposure evaluation, I'm not going to get too far into this. Jeff Kimble is going to give a talk on this in a couple of minutes. This is the Riverside Drive area and this shows a quite high density of sampling that was conducted over this past year. The purpose of this is re-evaluation of some residential properties, Priority 1 and Priority 2 properties, again IRA work performed in 2005 and 2006. A lot of you will recall that that IRA work involved stuff like interior house cleaning, duct work cleaning, covering of bare soils, raking of gardens, things like that. Properties where IRAs were not implemented in 2005 and 2006 where data shows a potential concern, we've got a lot more data now than we had back when these IRAs were first initiated, and we know more about where it is and what the concentration level is.

This helps us to understand -- this level of sampling focus in particular areas helps us to understand how much we can trust the GeoMorph evaluation when the land has been disturbed by residential land use, because GeoMorph does a pretty good job we think of predicting natural conditions on the floodplain. We're not sure that it does as good a job on areas where obvious disturbance has occurred,

like when people dig foundations and build houses and things like that. Besides Riverside Drive, a number of exposure units have been sampled this year. I think Jeff is going to talk about that. These are these purple boxes here. I think there's been another four that have been done -- five that have been done besides Riverside Drive.

This is a very quick one. As you may or may not know, the Department of Community Health has recently updated the fish advisory, which includes the Saginaw River, Saginaw Bay and Tittabawassee River, and the advisories have become somewhat more stringent. We have advisory signage out on the watershed and that's going to need to be updated to be consistent with the updated advisories. If you have other questions on this, we have Community Health here with us tonight. Kory Groetsch who is in the back of the room will be able to answer fish consumption questions and advisory questions.

Saginaw River sediment trap pilot, this is an IRA that MDEQ has deferred. It was requested in the April 16th letter, but because of dredging that's scheduled in that area for later this summer and fall, we've agreed to defer it. It remains an IRA option for the future depending on how things work out with

that. The Miss Dig process, we talked about this a little bit earlier. It's a mechanism to help alert contractors of potential contamination who are working in the floodplain. Dow is moving forward with a submittal on this and I don't think it's being termed an IRA but again we're looking for results and not for what it's called, and this is just an example of people working on the Dow Plant site in this case but doing some RGIS replacement work.

The IRA/PCAP residential decision tree, this will provide the opportunity to look at areas in the floodplain which trigger high concentrations. It's a mechanism to automatically initiate additional evaluation where you have some high concentrations, and the way this works is, if you're in the sediments, basically if you hit 10,000 parts per trillion at any depth, you have to do step out sampling. Overbank soil in the top 1 foot you need to do step out sampling to try and figure out how extensive it is, and again this is for IRA purposes. This is not for final investigation or remedial purposes, and then for residential soil property, it's 1,000 parts per trillion in the top 1 foot and then the change from last year is that this is in areas that are in active residential use. Dow spent quite a bit of time doing

step out sampling in areas that were not in active residential use but they were zoned residential, for example, some of the flooded areas, flooded low lands down by the river or flooded wooded areas that really aren't being used as a back yard or something like that.

So this decision tree process has been modified somewhat to reflect that. We're still having some discussions with Dow with respect to this issue that we expect to resolve shortly. The idea is to evaluate the extent, exposure potential, and vulnerability to migrate. We want to find out if IRA or other action is appropriate before the final remedial action. This may be further exposure unit investigation. This may be going directly to some kind of interim response activity where high concentration soils on a residential property are covered up, that type of thing.

This is an example of a decision tree and this just kind of takes us through the process, and basically, the first step is the delineation of an area that exceeds one of those triggers and then we determine if there's IRA work that needs to occur. We look at the timing and we look at can we actually do this as an IRA and is it executable. This just kind

of gives you a little bit more of a flavor for how we're making these decisions as we're going through this process. In 2007, this process resulted in quite a few triggers.

Just kind of reaching through here, I believe I have like two minutes which should be just perfect. The other part of what I want to do here and just to jump back to this talk, I was asked to just provide a brief update on what's going on with respect to the 2008 remedial investigation workplan for the Upper Saginaw River. Briefly, there's been quite a history. Last year in July, we got a scope of work from Dow in accordance with their operating license. MDEQ provided a high level notice of deficiency and a formal notice of deficiency. Dow has done some at-risk work over last fall and collected quite a bit of data. Dow submitted a revised scope of work, which was basically an outline of the remedial investigation workplan, in October. Quite frankly, the document and the other scope of work documents that we've gotten really haven't met what we were looking for in terms of that remedial investigation or the framework of that remedial investigation.

On February 1st, 2008, DEQ issued an approval of an application for the revised scope of work. Dow has

appealed that approval administratively and in Court and we are working our way through that process right now, and where we are now and I guess it's kind of -- there's been a lot of extensions granted for the submittal of the RIWP. Really I think the thing that bears mentioning here is we're not so much focused on the scope of work as we are on getting a remedial investigation workplan implemented that we can all agree with and the scope of work is kind of a vehicle to get to that RIWP. So what we need to do, both Agency and Dow, is to get to that point where we can get the remedial investigation approved so we can move forward with the investigation.

We are reviewing the remedial investigation workplan that we got from Dow and we're looking at that with reference to the February 1st, 2008, approval with modification scope of work according to the process that's identified in Dow's license. We have not yet finished that review. The typical process is for DEQ to provide Dow a notice of deficiency on the issues in the RIWP that need to be resolved, including a timeline to resolve those issues, and that's how we're proceeding at this point. In the meantime, DEQ is planning to continue to meet with Dow to attempt to resolve technical differences

on their remedial investigation scope and approach and to identify and communicate those components of the RIWP that Dow can move forward with in advance of full approval of the RIWP.

Basically, if there's things that we can agree on now, let's get out in the field and get that data collection process started. We don't know if we'll be there or not. As this is progressing, DEQ and Dow are going to continue to focus on working upstream and downstream with a lot of activities going on that we just talked about, including the 47 Building area, the H-12 investigation, Reach D, pilot bank stabilization, the in-channel work, the Miss Dig exposure investigations, the removal actions IRA, the in-channel work, all this work is going on, so we will continue to work through that. There's plenty going on this year. We're hopeful that we'll get some field work conducted on the Saginaw River Basin. Thanks.

CHUCK NELSON: Thank you, Al. Are there questions, clarifications? Okay. Hearing none, let's go on then to the overview of the 2008 GeoMorph sampling on the Lower Tittabawassee River floodplain and the Middle and Lower Tittabawassee River sediments.

JOHN MUSSER: Good evening everyone. I'm

here this evening to give you kind of an update on what we've accomplished in the last couple of years, to add some emphasis to what Al has already covered in terms of some information on the scope and the speed and the comprehensiveness of what we've been doing for the last two and a half years in this GeoMorph technology area. I would like to thank Al. He covered a lot of my turf here but I think we've got some additional detail that you may find interesting, at least I hope that's the case.

Just to recall, the sample areas or the work areas, the top area is the Upper Tittabawassee River, Middle Tittabawassee River and then the Lower Tittabawassee River. The work in the Upper Tittabawassee River was completed in 2006 as a pilot. Based on that work, it was agreed to go forward using basically the same technology with some minor modifications to characterize the nature and extent of contamination in the remaining portions of the Tittabawassee River. The sampling rationale that we took was mainly to understand the river evolution, how did the river end up being what it is today, what are the changes that took place. Al showed you some of that in terms of the changing riverbanks over the years. There's quite a bit of technology involved in

making these kinds of determinations and a lot of good information has been gathered as a result.

Also we're interesting with our sampling rationale to understand the river landscape through some precision mapping that was done again using state of the art type technology incorporated in the GeoMorph approach. We also wanted to understand the changes to the river over time through review of historical aerial photography. There's a good number of different maps and things that we've had at these meetings in the past. Some are still here to take a look at. They've been very useful in helping us improve our understanding of how things have been modified or evolved over the years. We also have spoken before at these meetings about some of the human influences on the river, things like building bridges, people taking their own initiative to improve soil erosion on their properties. These things all result in changes in how the river evolves and some of those are very critical to our understanding on how we might go forward in addressing some of the areas of need for remedial action, and perhaps more fundamental than anything, this work is being done to really understand what is a depositional area as opposed to what is an erosional area.

Just to provide a little bit of a summary on what we've accomplished thus far and I appreciate the acknowledgement from Al that a considerable amount of data has been gathered. We've done the in-channel sampling and analysis, this is in the river itself, from the Tridge just above Dow to Freeland Road, the first 11 and a quarter miles. We've sampled 653 locations and about 3,500 samples were collected, mostly on D's and F's or dioxins and furans, but also included samples to look for these other potential contaminants of interest that Al spoke about. The riverbank and/or floodplain sampling in that same area, we've gone all the way down from Poseyville Road to State Street, about another 17 miles total, 9,469 samples, and again a portion of those were to look for the secondary or other potential contaminants of interest.

I said I acknowledge and appreciate Al's reference to the fact that a considerable amount of work has been done. I think there's good evidence to demonstrate that this is really an unprecedented site characterization type effort, not just in terms of the science itself. The GeoMorph science is cutting edge technology. There's nothing out there that is as good for getting an understanding of an area of this sort,

of this magnitude and complexity, in a shorter period of time. We've also studied more than 10,000 floodplain acres and 22 river miles, collected and analyzed more than 15,000 samples for dioxins and furans. If you compare this to other sites around the country that have a lot of complexity to them, I've said this before, we're moving at ludicrous speed here in terms of getting an understanding of the river and getting a full characterization together.

Looking ahead now, our plans during 2008 in the Tittabawassee River for in-channel sampling would take us to an additional 12 miles in the river. We're going to take a look at about 400 different locations in the Middle Tittabawassee River and another 200 plus in the Lower Tittabawassee River. In addition, our sampling activities will cover more than 5,000 acres of overbank or riverbank and floodplain areas, including some 800 different sampling locations. 564 of those sampling locations importantly are locations that have been previously identified as Priority 1 and 2, and as Al described, those are properties that have flooded. The Priority 1's are the ones that have flooded the most and the Priority 2's are properties that have been flooded less over the course of the years, but we wanted to get a good sample base,

including both Priority 1 and Priority 2 properties, and I think we've achieved that thus far. So far, we've been getting good response to property access. We haven't completed that project yet but we do have 564 locations already where we have the access agreed to.

In terms of project timeline, again Al mentioned some of the timing here. We are basically at the point we've got conceptual approval from DEQ on the sampling and analysis plan for the remainder of the Tittabawassee River. We're going to be and we're already underway with the work as described in the approved plan. We're going to add some additional work, Al hit on this a bit, the implementation of the Upper Tittabawassee outfall investigation. I believe you referred to that as part of the H-12 effort. We're going to be looking -- again Al mentioned this as well -- at this river bed, bank stability assessment, looking at those areas that are eroding that also have higher concentrations of furans and dioxins, and then ultimately using that information to conduct some feasibility pilot projects to see what different technologies might work the best for stabilizing those banks.

At the end of the first quarter or by the first

quarter of next year, we'll be submitting an IRA workplan based on the investigations that we have undertaken this season and then, of course, hope to have a final Tittabawassee River full and comprehensive characterization report to DEQ by June 1st of next year. That completes my overview. Any questions?

CHUCK NELSON: Sure. Come on up for clarification.

AL TAYLOR: The conceptual approval, unless they have a formal written approval, of the Lower Tittabawassee River sampling analysis is on July 10th.

CHUCK NELSON: Other questions or clarifications? Hearing none, let's go on to the EPA talking about the update on residential assessment sampling activities and cleanup work.

JEFF KIMBLE: I'm Jeff Kimble. I'm an On-Scene Coordinator with EPA Region 5. Basically, what I'm going to talk about is an update on the residential sampling that we've initiated and again this was requested by DEQ after identifying areas out of the GeoMorph sampling where there were further concerns and we wanted to understand better what some of those areas were, and the main one I'm going to talk about is Exposure Unit 001, which has been in the

papers, as Al mentioned the Riverside Drive, Riverside Boulevard area, and what we were looking at in this residential assessment was to further determine when we do see an elevated sample in these areas what does it mean, what does it mean for that residential area, and to further define and more extensively sample that area.

At EU001, our trigger or what led us into that neighborhood was one sample from the GeoMorph that was a 5,900 part per trillion sample, one sample in the entire neighborhood out of that multitude of samples that you saw they had collected through there, and what our concerns were we wanted to again extend that sampling effort and what did that mean when we're looking at soil contamination in the yards, potentially inside the houses, and look to see if there was any contamination inside the houses and if that soil contamination from that one point did extend throughout the neighborhood. What we see here is, and I think the actual position is just slightly off, this basically represents -- the blue boundary there is what we consider the area, the Exposure Unit 001 area, and we had one sample result in there that was around 5,900 parts per trillion, and in the last meeting we were here, we showed just a brief snippet of what the

sampling frequency we were going to do for the neighborhood, and the goal of that was to try and capture as much data as we could so we could, one, understand that extended contamination throughout the neighborhood and hopefully have enough data to help us determine what needed to be done here, if something needed to be done, specifically to this neighborhood.

One of the reasons this was elevated, through EPA from the State and from our working group with DEQ and DCH for concern, is this neighborhood is fairly unique in that the flood waters when it does flood here come all the way up to the front door of these people's houses and sometimes inside the houses, which is pretty unique from other exposure units in the floodplain. These are our sample results based on extending out that one point of sampling data and where you can see the red points, all these red dots, are any samples over 1,000 parts per trillion TEQ at the surface. There are a few mixed in there as well that were above 10,000 parts per trillion at the surface in these residential yards. You can see that this sampling also revealed here the contamination based on that one original sample point in this area shows that the entire neighborhood here has elevated TEQ results for dioxins and furans.

This is a summary basically of that data per parcel, and I apologize, I cut it off here on the bottom a little bit, but what we're seeing is there were a few areas that were elevated that were outside of that flooding zone and there were some fairly low results on that one property that was elevated. However, we had results either in the surface or subsurface soils in this neighborhood as high as 33,000 parts per trillion and our average for the neighborhood was approaching 2,000 parts per trillion when you averaged out all the sampled results. So EPA and our partners, DEQ and DCH, determined that somewhat immediate action should occur in Exposure Unit 001 area in this boulevard because we have consistent higher level contamination spread across this neighborhood at the surface and we're also seeing that contamination migrating into the houses. We did get dioxins and furan results from inside the houses.

The profile of those congeners matched the congener profiles that are in the soil, meaning, you know, we're seeing the same patterns of contamination in the indoor contaminants that we saw in the soils outside, which pretty easily led us to believe that it was being tracked into the houses. We're seeing an increase of the dioxins and furans inside the house.

We also had the unique nature here of one of the few dirt roads in a flood area that adds to that. They're very dusty in nature. Every time the residents would drive up and down the road, and we sampled the road as well, there was contamination in the surface soils there as well.

So what that led us towards was EPA and Dow negotiated an administrative oral consent. Basically, the Agency and Dow have agreed to a cleanup plan and Dow agreed to do that cleanup work for this area. The basic tenets of that cleanup plan are the areas immediately surrounding the house, basically the yards, and those areas surrounding the houses up to the road and from the roadway pretty much to the river there's going to be removal of 2 feet of material taken out of there, the contaminated material removed from the neighborhood, at least 2 feet of clean material brought back in, and then surrounding the actual yard areas, we're calling it the transition area of the east, west and north transition areas, there's going to be a 1 foot removal of soils from those areas and an indicator layer put down so that any future work there that people will know that they're getting into an area that was not excavated but 12 inches of clean material will be put back to

prevent any contact. The roadway itself, there's going to be at least a 6-inch removal of the roadway as it is right now. That will be refilled, regraded and will then be paved and the driveways paved as well to reduce any dust contamination into the air, which also will reduce that migration inside the houses.

So for Exposure Unit 001, that's basically where we're at now. Dow has been steadfastly working out there to get those work elements put in place to begin that cleanup work. At this point that work is scheduled to be initiated and completed by October 15th I believe is our date and that's going to also include restoring the structures that are disturbed or moved, revegetating the properties themselves, and again the paving of the road and driveways, and again, you know, we're seeing here is this area is flooded right up to the doors. That's why we're addressing the entire exposure unit as a whole.

What we have also seen is we've done some further sampling on other exposure units in the floodplain, this part of the Tittabawassee River, again in concentration with the State in areas where there were other concerns, other potential exposures or exposure units, and you can see those here. You'll notice that

we've got EUs 001, 002, 004, 005 and 006. There was an EU003. The reason it's not on this map is initially there was a concern for that property on the list of concerns. After further evaluating the property as far as priorities goes through the State, it was actually lowered back down the list. Therefore, we didn't sample that exposure unit yet. Not that it's been abandoned. For now though, it was not sampled. So this is basically in general where the exposure units are at. Again down here is where Exposure Unit 001, the Riverside Boulevard area, is at, and as you go upriver towards Midland, there would be other exposure areas that have been sampled.

Moving forward into these other exposure units, again the approach was the same. We want to look at the areas where we've seen elevated hits based on the GeoMorph sampling and where the State has identified areas of concern, what does that sampling mean when we look out and extend beyond it, and one of the different approaches we used here, too, so that we didn't have the same enormous number of sampling frequency was to look within that exposure unit to select one or two properties and use those as a representative property and keep the same sampling frequency, just not sample every property within that

exposure unit. Again we're looking to see if we saw contamination inside the homes and if that contamination actually matched up with the contamination profile of what was in the soils if we found it.

One of the things that was important to note as we move outside of this Riverside Boulevard or Exposure Unit 001 area is we're seeing more of a different geography in the way most of the houses are along the river to where they're not built in that area where the flood waters come right up to the door of the houses. I think we may have mentioned this Priority 1 properties before, sort of in line with that, Al. What we're seeing is there still are portions of many of these properties that are in that flooding zone. However, for the most part, the houses themselves are elevated out of that. They're built on the higher ground. The areas that are maintained most often are up near the house and the lower areas are where we are seeing more of the contamination in these other exposure units or the higher levels of contamination. Again Exposure Unit 001 was slightly different.

In that lower area, we're seeing a mix of property use basically; although, we're not seeing as

many houses such as are in the Riverside Boulevard neighborhood where you have that low topography, that flooding right up to the house. We are seeing properties with mixed use that do flood like that. Some of the lower portion of the properties or that flood area of properties is maintained right up to the river. In some cases, there are parks that are used that are in that flooding area, and again we have seen in areas where there is contamination on the property, we have also documented to a different extent, that contamination is being seen inside the homes as well.

In summary for the other exposure units -- and initially, we focused on Exposure Unit 001 because that's the one that's been a priority and was our initial priority. So the status of where we're at now with the other exposure units is we've got the data back and we're just now consulting with our partners on that data. We've shared it with the residents either in person or have mailed it at this point to the residents and we're trying as much as we can to sit down with them to go over the data for their properties, and again in summary, what we're seeing is that when we do see the soil contamination near the houses we're seeing that same profile of contamination inside the houses. It does differ depending on the

amount of contamination in the soil how much of it is inside the houses, and again EU001 or Exposure Unit 001 is pretty unique in the fact that their properties really flood all the way up to door and a lot of these other properties we looked at don't. Portions of their properties do flood like that but not always up and into the houses and that is our more typical property that we've seen.

That's pretty much all I have for this part of the presentation but what I just had here, including the maps, will be posted at this website if anyone needs to see it.

CHUCK NELSON: Questions or clarifications for the EPA? Come on up to the mike.

AUDIENCE MEMBER: I was just wondering what happens to the soil that's removed, where does that go, how is that taken care of? And if I could follow up with a second one, what do we expect to happen with these properties when they flood again, which I assume they will?

JEFF KIMBLE: There's two questions there. The first one is, under the order, Dow is required to dispose of those soils at an EPA approved disposal facility. So as long as it meets EPA's offsite rule, Dow will be able to dispose of it there. For what

happens when it floods again, Al, do you want to take that? That's something we're talking about and again it's kind of like a team approach here and that's an issue we've identified. I'm going to let Al address that because right now it's appropriate for him to do that.

AL TAYLOR: That's a great question. It's going to reflood and it's going to recontaminate to some extent. What we don't know is to what level it's going to recontaminate or how fast it's going to recontaminate to a level that is a problem. One of the elements that we need to work out as part of this is an ongoing monitoring plan for the Riverside Drive area to carefully track that after these flooding events occur and see what the concentrations are doing as flooding does occur. In some cases along the floodplain, we've seen that reflooding doesn't result in much additional contamination. In other places, we have seen significant recontamination in the surficial sediments that are deposited.

So that's what we're going to be working on with EPA and with Dow is an ongoing monitoring program, and if it does begin to recontaminate to a level that's a problem, we're going to have take additional action. Our hope is that upstream controls like these bank

stabilization efforts, the in-channel removal efforts or stabilization efforts, are going to occur fast enough over the next several years to prevent the recontamination of Riverside or other areas like Riverside to a point that they have to be kind of touched up at the end of the remediation process or during the remediation process.

CHUCK NELSON: Other questions or clarifications?

DR. DAVID GARABRANT: David Garabrant, University of Michigan, I have a number of questions. The first is you presented on the samples the mid, max and the mean. With skewed data like that, I would think that the median would be a better indicator of the central tendency. The average is the means are high with skewed data like that.

JEFF KIMBLE: We've looked at it and the State has looked at it as well, the 95 percent UCL and other ways of presenting it. For the one I presented and the only one I put the data up for, the bottom line for that is, even if you just step back and look at the map, the average for the entire neighborhood is high.

DR. DAVID GARABRANT: Well, my question is why didn't you present medians rather than averages?

Averages don't represent the middle of the distribution where you've got skewed values like that.

JEFF KIMBLE: We'll think about it for next time. For this time, we just threw up the averages. We didn't put up all the data.

DR. DAVID GARABRANT: That would be a better way to present it.

JEFF KIMBLE: Okay. We'll take that under advisement for next time.

~~AUDIENCE MEMBER~~ DR. DAVID GARABRANT: That would be more representative.

AUDIENCE MEMBER: And then my next question is, you said that the soil and dust showed the same congener pattern. Could you quantify that, how you assessed that they showed the same pattern? And also, are these values that you're showing based on D's, F's and PCB's? Is the TEQ based on 29 congeners or are these just the D's and F's?

JEFF KIMBLE: I'm going to ask Deb to take that one because our State partner is the one that actually helped us do that profile.

DEB MacKENZIE-TAYLOR: David, the sampling and analysis that EPA did was just the 17 dioxins and furans. They did not include the PCB's I don't believe from the data I've seen and we did just look at the congener patterns based on percent TEQ and

there was clearly the component that has those furans was very predominant in the soil samples and in the indoor dust samples and I can show that to you if you want it at some point.

DR. DAVID GARABRANT: That helps that you didn't include the PCB's, and then my third question is, do you have any evidence that what's in household dust has any relationship to what's in people's bodies or that gets into their bodies?

JEFF KIMBLE: I can answer part of that. I don't. I'm not privy to a lot of that data, especially not specifically to individuals.

~~AUDIENCE MEMBER~~ DR. DAVID GARABRANT: What data?

JEFF KIMBLE: Specifically, the congeners in an individual's blood. I don't know if, Deb, you want to elaborate on that, but from our standpoint, to do a property by property comparison, I can't do that. I didn't collect blood data. I'm not privy to any personal blood data. I'm not privy to health decisions.

DEB MacKENZIE-TAYLOR: And again, David, we don't have blood data to look at, but it would be useful to look at if there was blood data for these particular individuals that someone could look at that and see if there's a difference between these

individuals which had contamination all around their houses compared to maybe some other people that were in another place and see if there's a difference. That would be good. Instead of, where this is kind of a unique situation where there is a significant amount of contamination around the individual houses here.

DR. DAVID GARABRANT: And as you know, we've actually looked at the blood and household dust and found no correlation at all. They don't relate to each other.

JEFF KIMBLE: Well, the very limited data that was shared with us we've shared with the State. Again I don't have -- I can't answer that from a health perspective. I'm not privy to that and I don't think the State has been able to see that data either, so we can't basically make an opinion on what you just asked.

~~AUDIENCE MEMBER~~ DR. DAVID GARABRANT: Well, it's on our website, not the raw date, but the results and correlations.

JEFF KIMBLE: I think to make an independent determination our health folks need to see the raw data.

DR. DAVID GARABRANT: I think the University of Michigan is well qualified to do that analysis.

JEFF KIMBLE: Again I can't answer that.

DEB MacKENZIE-TAYLOR: David, have you looked at these individuals specifically separately to see if there is a difference?

DR. DAVID GARABRANT: I can't comment on which neighborhoods were or were not included in our study. We certainly can look at the most contaminated properties, in other words, to stratify the most contaminated ones in our study.

DEB MacKENZIE-TAYLOR: But you haven't done that yet?

DR. DAVID GARABRANT: Well, we've looked at residual plots and I think that there's no pattern there.

CHUCK NELSON: Other questions or clarifications before we move on to the Former 47 Building? Please go to the microphone.

AUDIENCE MEMBER: Phil Moon from 740 North River Road and I live between State and Gratiot and I lived on the old Cavanaugh Lake. Well, the lake doesn't exist anymore and I've lived on it for 43 years and it's completely dry, filled with sediment, and a yellow crud is on it now. When I first moved there, it was 52-feet, 3 inches deep. Tied to a cement block, it was still tight. Now it's full, and I wondered where the Environmental Protection Agency

was when this all took place? No one has done anything. It was a fresh water supply. It was spring fed and it's a large lake. It was the only natural lake in Saginaw County and it was registered by the Army Corps of Engineers. Now it's completely dry and it has a yellow crud on top of it. That's where the birds and fish and everything, there isn't anything there anymore.

So if somebody from the EPA would like to come out on my property, they're more than welcome. If Dow would like to come out, sample it, if the EPA would like to or if anyone else here would like to come out there, you're more than welcome to. Thank you.

CHUCK NELSON: Any comment on that?

JEFF KIMBLE: You can talk to us some more after the meeting and give us some more specific information on that because I'm not familiar with it today.

AUDIENCE MEMBER: Thank you.

CHUCK NELSON: If you have other questions, please come to the mike.

AUDIENCE MEMBER: Well, they're talking about the blood study there and I think the study is kind of watered down. I think there needs to be another study on the people that are actually using

the river and the people that have hunted and ate the wildgame and are down there. There's a lot of people in that study that have never put a foot in that floodplain and I think it's time for them to do another study.

CHUCK NELSON: Okay. We're heading off a little bit into areas that are probably better for the general comments. I want to wrap up comments about the EPA's particular work on residential assessment sampling. I realize Dr. Garabrant kind of opened that door but we'll save that for later so we can finish our regular presentation and give folks an opportunity.

Any other questions for the EPA? Okay. Thank you very much, Jeff. John, you have folks who are going to talk about the Former 47 Building and riverbank historical waste removal.

STEVE LUCAS: My name is Steve Lucas. I'm a Remediation Leader for Dow and among my job responsibilities are corrective action issues for the Dow Plant site in Midland. I'm here this evening to briefly discuss what we discovered in the 47 Building site, and actually, Al did quite a good job already describing that but I'll add a couple more pieces of information.

The 47 Building was demolished in 2006. It had existed in various forms on-site for just over 90 years. It was our main administrative building for the plant site and, in fact, for much of that time for the corporation itself. Dow plans to use this property to construct a garden park between the Dow Plant and the Dow Diamond to add green space, and construction on that park began in April of this year. As excavation started, it revealed debris from historical chlorine manufacturing processes immediately adjacent to the river. Sampling did identify elevated levels of furans and dioxins at the site. We've responded and to this point removed over 15,000 cubic yards of debris and soil and sent it to Salzburg Landfill which is our permitted hazardous waste landfill. After removal, we brought in at least 6 inches, in many cases more because of some contouring we're doing of clean soils from off-site, and have revegetated the site with grass, sod, native plantings, trees.

Just real quickly, this is the Upper Tittabawassee River investigation area, including the plant site, and the 47 Building area is at the upriver end of this area and it's adjacent to the Reach B portion of the river. That's an aerial photo of the

47 Building as it sat somewhere just prior to 2006, and that is the site as of late July. It's more complete today. We've removed the debris and contaminated soils we found here and rebuilt the bank. This is erosion control matting and native plants and grasses are going to grow back in here. The pipes you can see there are irrigation.

This entire area was stripped off and new soil, sod, and a number of trees and plantings have been installed. This area down in here currently has plastic tarp on it and trees. This is an area that requires additional work. We couldn't do that work when we did the other stuff because we needed a modification to the floodplain permit to work in the area. We filed for that permit, and as of last week, I've received a telephone call that the permit has been issued, so we should be able to resume work in this area fairly soon.

Remaining work for the year at this site, we'll complete the bank removal and rebuild the bank where we excavated similar to what you've seen and we intend to complete the characterization of the river Reach B adjacent to this site to understand what if anything may be in the river adjacent to the site, and that completes my presentation.

CHUCK NELSON: Questions for Steve on that? Hearing none, we're at the public questions and discussion area a good bit early, so the public has lots of opportunities tonight. So if you have a question or a comment, please come to the mike and we will get the appropriate people up here to answer it. Go right up, sir.

AUDIENCE MEMBER: My name is Craig Tucker. I'm a third generation resident on the Tittabawassee River on my mother's side. I had two generations on my father's side. We own five houses on the Tittabawassee River, 1365 Midland Road, 1381 Midland Road, 1395 Midland Road. The ones in Freeland I'm not certain of the addresses, but the one house my family had lived in for 85 years. I grew up in there. We had a garden in the floodplain, fruit trees. When you spoke of repeat flooding, it flooded twice a year, and really there's no real health problems on my family's side. I can't speak for everyone here, but we built rafts, played in the flood waters, rode our bikes into the flood waters. Again the gardens, probably at least a half an acre garden that we canned everything from it and really no problems.

I did have one question for the EPA though. On the monitoring of excavation, how long has that

actually been ongoing?

AL TAYLOR: Clarify what monitoring you mean?

AUDIENCE MEMBER: Well, actually, I was wondering, there was a storm drain that was excavated within the last 15, no more than 20, years along the back. It's probably a mile long. It relieves the storm drainage from Fox Glenn, if I'm not mistaken, all the way back to what used to be Arrowwood School, and I was just wondering, if there was a problem with the soil, what was done with that soil that was excavated from that storm drain?

AL TAYLOR: The understanding of the extent of soil contamination on the Tittabawassee River, we didn't really begin to understand the extent of contamination until about 2001. I think 2001, 2002 is when DEQ began taking some samples based on some grants that we obtained from both the State and Federal Government. So prior to that, there is probably not a record or a restriction on what happened to those soils. The Miss Dig program that I kind of talked about a little bit earlier, the purpose of that program, IRA or whatever we're going to call the new system, is just to make sure that utility workers in the floodplain, people who would do things

like put in sewer or water lines, things like that, are aware of the contaminated soil, special handling and disposal requirements associated with generating that soil, and also for personal protection reasons, so that is actually the prime focus of this Miss Dig IRA.

CHUCK NELSON: Other public questions or comments, please come to the microphone.

AUDIENCE MEMBER: I had a couple of questions but just cut me off, okay, if I'm going too long here. I wanted to know how old those outfalls are that you're looking at?

AL TAYLOR: They range in age. Dow has one active outfall right now at least from their waste water treatment facility, the O31 outfall, and that's been their principle outfall for I'd say 20 years now or more, but historically, there have been quite a few outfalls at the Dow Plant site, and as waste treatment practices improved over time, then those outfalls started going away, but things that were discharged from those outfalls may remain in the river in high concentration deposits close to the outfalls and that's why we got this H-12 remediation program going.

AUDIENCE MEMBER: How far down the river does that chlorine cell waste bank that you showed us,

where does it start roughly? Do you have information on where it starts and where it ends on the river, how long it is?

AL TAYLOR: Steve had a pretty good graphic there showing where the estimated extent of that is. It was basically all along the Former 47 Building face. What we don't know yet and what's scheduled to be found out later this year is if that extends upstream off the Dow property toward the Poseyville Bridge. We have data, Dow has developed data, both in the river and on the riverbank but I think it's only in the river where contamination has been identified up to. There's a City of Midland storm sewer outfall which goes up to at least basically the Dow property boundary. Further investigation needs to be done in coordination obviously with the City of Midland to determine if this chlorine cell waste extends further upstream. It's hard to tell right now. Right now the bank is quite overgrown and it's just going to take some crawling around on it to take some samples.

AUDIENCE MEMBER: I don't need you to spend a lot of time on this but we would just like some rationale as to why you were deferring the sediment traps because of the dredge project on the Saginaw River?

AL TAYLOR: The rationale behind that is our understanding based on -- and I'll look for some help because I wasn't in this particular meeting with the Corps of Engineers, but my understanding is that based on the meeting between the Army Corps of Engineers, Dow and MDEQ, I believe it was in June of this year, the Corps kind of indicated that dredging in that upper portion near and even within the Sixth Street Turning Basin was going to be occurring this year, so the goal of having some sediment removal occurring out of there isn't going to happen. So the question is that into the future, you know, how much dredging is going to occur in the future and is the dredging that would occur this year going to be repeated next year and the following year until --

AUDIENCE MEMBER: Right. The thing I'm thinking about is, if they're dredging that upper portion of the river, that doesn't address the migration of those sediments necessarily further down river that migrated there or does it?

AL TAYLOR: It does at least partially address that because you're removing the contaminated sediments that have filled in the basin since it was recently dredged.

AUDIENCE MEMBER: Okay. And from the

perspective, too, Al, that, you know, the Saginaw Bay, as everybody in this room knows, is an area of concern, and two of the major impairments for use in the Saginaw Bay is turbidity and sediment migrating out there. So I mean I think this is a really bigger issue that DEQ needs to be looking at and EPA needs to be looking at, but we can talk about that at a later time, and just one more question, can you just give us a summary of what's going on in the City of Midland right now? I mean it seems like it just dropped off the radar screen.

AL TAYLOR: A brief summary of what the City of Midland is looking like right now, we are going to be re-engaging the City of Midland with respect to the soil contamination. It has taken a bit of a backseat with all the other work that's been going on right now but it's going to be re-emerging probably I would say in September of this year, and quite frankly, you know, there's some work to be done there. We've kind of stalled out on the viewpoints of needing some additional data versus analyzing existing data that we've got and it's been a challenging project but we are going to be re-engaging on that issue probably later this year. I'm looking to Jim to see if that -- yes.

AUDIENCE MEMBER: Thank you very much.

CHUCK NELSON: Other comments or questions?

AUDIENCE MEMBER: Like Michelle said, Chuck, if you see a line that I miss behind me, please let me know and I will sit down.

CHUCK NELSON: I will tell you.

AUDIENCE MEMBER: Thank you. Al, in the beginning of your presentation, you indicated that there were a number of other contaminants in the sediment and one of those was listed as parathion. Could you expand on that? Does that breakdown organophosphate pesticide?

AUDIENCE MEMBER: Yes, it's an organophosphate pesticide. It's quite toxic and it's something that has been found in fairly high concentrations adjacent to the Dow Plant site, and actually, in this Reach JK area, it's also been found in sediments down there, and it's actually a bit surprising because the environmental state characteristics of ethyl parathions suggest that it really should have degraded over time. That's clearly not what we're seeing, and one of the things that we looked at, you know, pretty carefully at the beginning of this, and I think Dow has looked at it very carefully, was, you know, making sure that we didn't

have some kind of ongoing release from say contaminated ground water from the plant site or something like that. We really don't have an indication that that's happening.

We do have this quite high concentration deposit adjacent to the old Dow Pond, we think, and this is -- I'm not going to speculate too much on it, but it looks like it might be associated with discharges from the old 001 outfall because there's some other ethyl parathion hits hitting up closer to that historic outfall which was kind of an emergency outfall for Dow and I think still is actually an emergency outfall for Dow.

AUDIENCE MEMBER: Any idea how ubiquitous this material is? Could it have reached Riverside? Is it in the Saginaw River also?

AL TAYLOR: It's one of those compounds that is not unique to the Tittabawassee River. It has been found upstream of Dow in some background samples that have been collected. One of the things that I think is a good part of what's going on this year is the collection of additional background samples from both upstream on the Tittabawassee side and on the Chippewa River side because there's the old Velsicol Plant upstream of Dow on the Pine River which is a tributary

to the Chippewa and it's quite aways upstream but we definitely see DDT and DDE compounds associated with Velsicol showing up in sediments downstream of Midland but it is something that we are seeing.

AUDIENCE MEMBER: But generally not tested. The dioxins and furans are still the highest priority?

AL TAYLOR: Well, dioxins and furans certainly are a high priority but these other contaminants of concern, or PCOIs as they're being termed, are a high priority as part of this investigation. Now they're not being tested for on the frequency of dioxins and furans but there will be some additional testing for these PCOIs and determining the environmental fate of those other kind of contaminants is real important and one of the things that, you know, as if this project wasn't complicated enough type things.

For example, where we see the really high concentrations of ethyl parathion adjacent to the Dow Plant site at this Reach H location, we don't see high concentrations of dioxins and furans. Those contaminants aren't necessarily co-located, so you may have a different -- the environmental fate of contaminants may be different depending on what it is. So we can't just assume that when we identify the

dioxins and furans and we clean those out that we're cleaning up the other potential contaminants of concern and that's why this additional sampling, this PCOI sampling that was being done, is not looking just at where dioxins and furans have been detected at high concentrations. We're also looking at the other environments that we would more typically see these kinds of contaminants in the more fine grain materials and more organic rich materials, things like that.

AUDIENCE MEMBER: Now I guess, and you may have answered this already, but are you looking at some of those other materials, other contaminants at Riverside?

AL TAYLOR: Yes. In fact, that's one of the screens that the State did is that we collected cores and split cores with U.S. EPA and the State lab to analyze those PCOI's. We did find some hexachlorobenzene which is a contaminant that we're seeing pretty well associated with Dow Chemical down there but not at super high concentrations. We have done limited sampling on those, but in the case of the Riverside Drive removal action, you know, we believe that removing those 2 feet of soil and then putting down a marker barrier and replacing it with clean soil is going to address certainly the dioxins and furans

and any other compounds that would have been deposited there. These other contaminants are not present in concentrations that would be an issue, you know, at 2 feet down, at least for human exposure.

AUDIENCE MEMBER: Okay. Thank you.

CHUCK NELSON: Hang on just a second here. I think Peter wants to add a little clarification.

PETER SIMON: Good evening. My name is Peter Simon. I'm the Project Manager for the GeoMorph investigation and we're responsible for generating not only the dioxin and furan data but also the secondary COI data and I just want to provide a little additional clarification as it relates to the secondary COI. There's about 400 samples that we've analyzed upstream and downstream for secondary COI based on fate and transport characteristics. The behavior of the secondary COI is different in a lot of instances than the dioxins and furans, and as we have moved down river, the concentrations are steadily decreasing, so I don't want to misconstrue this. Where we're finding them is where you would expect to find them based on fate and transport characteristics but the concentrations are continuing to decrease as we move down river.

AL TAYLOR: I think I would agree with our

GeoMorph colleague in most cases because we do have some situations where we're identifying some relatively higher concentrations farther downstream that have yet to be explained.

AUDIENCE MEMBER: And I guess a follow up to that is, if, in fact, the majority of these higher concentrations are upstream, is there discussion around realtime removal of these as the higher concentrations are discovered?

AL TAYLOR: Well, in fact, that's what that H-12 program is centered around is identifying the areas with these high concentration deposits of not only dioxins and furans but these other contaminants that we're talking about and then dealing with those, either via removal or capping or some other methodology, to keep them from being a continuous source to downstream, and basically, we want to make sure that we address all of the Reach D type deposits that may be adjacent to the plant site and we think we know where at least one of them is and that's high on the priority list to be addressed.

AUDIENCE MEMBER: And there seems to be cooperation with Dow in terms of addressing these? That's not a disputed area at this point?

AL TAYLOR: No. I think right now we're in

the let's figure out what we've got and dealing with this in an upstream to downstream way and you can't get more upstream than the Dow Plant site. I think there's a lot of concurrence in that kind of philosophy. Now we haven't gotten down to the brass tackstics of what are we going to dig up, what are we going to leave in place, what are we going to cap, but that's coming as part of this process.

AUDIENCE MEMBER: Well, also in your part of the presentation, Al, you talked about the eroding bank stabilization for pilot stabilization areas but didn't give a lot of detail for as far as I can remember a timeline. Is this still being explored with Dow?

AL TAYLOR: Yes. Right now, in fact, Todd Konechne the Project Manager for those is trying to schedule a meeting with me next week or very early the following week to talk about the different technologies that would be applied to these core areas. So this is going forward and we've got to go forward on a timeline where things can get established basically this growing season, because as you probably have heard, we're trying to look especially at technologies that are not, you know, like dumping concrete riprap on the riverbank. We're looking for

bioengineering type approaches where we can, to the extent possible, utilize native species and plantings on banks and kind of softer stabilization techniques rather than the harder techniques. That's not to say that in some cases we might not need to do some of the more standard riverbank stabilization techniques because there might be and probably are some areas in the river which are just not going to be stabilized without some hard engineering on it.

AUDIENCE MEMBER: Is it conceivable that some of these pilots will be in place by November by the next meeting?

AL TAYLOR: I believe so.

AUDIENCE MEMBER: Excellent. Very good.

CHUCK NELSON: Terry, I'm going to ask you to sit down. I know we've got a couple of other folks. Let's let them come on up. Come on up to the microphone, sir.

AUDIENCE MEMBER: I've got a question I guess maybe for Jim Sygo. Now that the U of M study has shown that dust and soil are not major contributors of dioxins in our body burden, and as I look at this decision tree and the residential property soil, the 1,000 parts per trillion in the top 1 foot as a trigger level, does that mean we're going

to be revisiting the 99 parts per trillion as the State standard and the fact that, you know, our area has this facilities designation hanging over our head? I mean, is that going to be revisited? Are we relooking at the 99 parts per trillion?

JIM SYGO: It's not 99. It's actually 90, which is the generic criteria that was established as Part 201, but are we going to be revisiting it, that's -- you know, likely we're going to continue to be looking at that. Historically, Dow has proposed a site specific process and risk assessment to establish a number other than 90 and that process hasn't been completed yet, but as that's completed, that's what we would be looking at in terms of what Dow presents to us.

AUDIENCE MEMBER: So where does that fit in with the 1,000 parts per trillion as a trigger level for residential property then?

JIM SYGO: The 1,000 parts is a number that EPA uses as a trigger at which time action is actually needed. I don't believe it's interpreted as a cleanup number. It's interpreted as an intervention number, and when there's an excess of 1,000 or more parts per trillion of dioxins and furans, the expectation is that action is taken to mitigate any exposure to

particularly residents in those areas. Is that accurate EPA, Mario? I think they're concurring.

AUDIENCE MEMBER: But what we're saying, what Michigan is using right now, they're using in this area 1,000 parts per trillion.

JIM SYGO: Again we're using 1,000 to determine if immediate actions are necessary. Back in 2005 when we initiated the frame work, the agreement was that we would move forward in the context that areas that had 1,000 or were estimated to have 1,000 based on the limited sampling that the Department of Environmental Quality had conducted at that time that those were areas where exposure controls were needed.

That's when Dow had contractors go to those residential areas that were Priority 1 residential areas, and if it flooded up to within 20 feet of the home, they took actions to not remove soils but in terms of cleaning the carpets in those areas, trying to lift any seed beds or flower beds or vegetable beds, and making sure that there's no bare soils that were exposed, so that they could reduce any exposure to people within the area utilizing those areas.

AUDIENCE MEMBER: Yes, I understand that. It looks to me like we're living under a much stricter standard. That maybe we didn't have to live with the

facilities designation if we went to the 1,000 parts per trillion which we seem to be using anyway.

JIM SYGO: Well, you know, there's standards all over the States, and if you look at the States throughout the nation, the standards go from 6 parts per trillion -- 4 parts per trillion all the way up -- I think Minnesota has 200 parts per trillion, so it depends in statute what your risk levels are for that State. At one point in time the risk level in Michigan was one in a million. That was back in 1995 or 1996 I believe. They changed it at that point in time to 1 in 100,000 risk, and since they changed it to that point in time, the number that's been established for the 1 in 100,000 risk, which means that one individual exposed to the 90 parts per trillion over the duration of a certain period of time and everything would likely contract cancer.

Now when you're looking at a population of 100,000, it's difficult to even determine how many people you would have there. It's hard to be very selective in being able to identify those risks that are associated with the environmental contamination, but you know, there's continued efforts going on in looking at that. One big help to this would be when and if EPA completes their dioxin reassessment that

would help establish a more uniform number across the nation.

AUDIENCE MEMBER: And how many years has that been going on?

JIM SYGO: That's been going on since '93.

AUDIENCE MEMBER: About 20 years. I mean, I would hope that we wouldn't have to live with this designation over our head for the next 20 years based on a bunch of assumptions because that's what this all looks like it's doing.

JIM SYGO: Well, we're doing the best we can with the information we have, so I don't know what more I can tell you.

AUDIENCE MEMBER: We have a lot of very good new information that, you know, degrades the severity of the dioxin issue. With the U of M study and everything, I would think that we would take a real, real hard look at that, because you're our State agency and you take the best interests of the community at heart and at least look at this facilities designation and removing it.

JIM SYGO: Well, the U of M study has nothing to do with the facilities designation. The facilities designation is premised on whether or not you've got levels contaminated above the generic

criteria identified within the State regulations and those rules are established in regulation. There has been some discussion that assuming that there's a site specific cleanup and the site specific cleanup is acceptable to the State of Michigan that we would consider legislation that would remove any facility designation if a number is above 90 but at or below a site specific number that's been selected that's acceptable.

AUDIENCE MEMBER: Okay. Thanks.

CHUCK NELSON: Other questions and comments, please come to the microphone.

AUDIENCE MEMBER: This would be -- I'd like a response from Dr. Garabrant and it's in regards to the Riverside Park residential area. Do you find this concerning when you look at this with all the sampling of where there is significant elevations and people are living in this area?

DR. DAVID GARABRANT: Well, of course, I do.

AUDIENCE MEMBER: What would you suggest? What would you suggest as far as in trying to remediate this type of situation? Would you suggest anything in regards to protecting residents safety? What are your thoughts?

DR. DAVID GARABRANT: My thoughts are that

whatever is done should be based on evidence that it has a benefit. I mean, that's the whole point. There is good data that says that what's in household dust has nothing to do with what's in people's blood, and if you're going to take action, you have to think about, well, what does that mean, and so, of course, those soil levels are of concern. They're very high, and the question is then, well, what's the sensible thing to do and what does the data show and how should that guide us?

AUDIENCE MEMBER: Is there something that you would suggest through U of M and your work that you've done that you would suggest to EPA or our Department of Community Health as far as becoming a partner in perhaps doing further testing?

DR. DAVID GARABRANT: I would wholeheartedly support cooperative work between the EPA Region 5, MDEQ, MDCH, and the University of Michigan to collect data and analyze data and use that data as a basis for making sound decisions, absolutely, yes.

AUDIENCE MEMBER: Thank you.

CHUCK NELSON: Other questions or comments?

AUDIENCE MEMBER: I'd like a number on the site specific process and what's going on with taking so long, either from Dow's perspective or MDEQ's

perspective. It just seems like it's been going on for a really long time.

DEB MacKENZIE-TAYLOR: There were a series of meetings that were going on over a year and a half I believe that ended probably last June discussing the risk assessment and we did receive a revised human health risk assessment in June of this year. We are reviewing it. Right now it's a human health risk assessment workplan. It doesn't specifically say what they're going to do but it does outline approaches they're going to use. It doesn't give you the exact data they're going to use but the approaches. The State thinks that maybe the best approach would be to have that go through a scientific review process and we've offered to do that. I don't know what direction we're going to take at this point in time. We're still undergoing our own review in conjunction with U.S. EPA but that decision will be made within the next couple of months.

CHUCK NELSON: Does EPA have any comment on that or Dow? I think somebody has a comment.

LISA YOST: Specific to the direct contact criteria, is that the question, or the risk assessment workplan?

DEB MacKENZIE-TAYLOR: The human health risk

assessment workplan that was submitted either all or in part of it which included the direct contact criteria report.

LISA YOST: My name is Lisa Yost. I'm a toxicologist. I work for Exponent and I'm helping Dow with the human health risk assessment. There have been actually a couple of risk assessment work plans that have been submitted and we've tried to be proactive in integrating new information as it comes in. It is a large and complicated site. We're doing our best to incorporate all the relevant information, and of course, we're working in the absence of a completed toxicity value for the main contaminant and that does prolong the discussion because there's some uncertainty about the appropriate toxicity information to apply, but we are with MDEQ making every effort to work through this process.

And of course, as you know, there's an extraordinary amount of data as well, and so until the characterization is complete and the data are all available, we won't be able to do a complete site specific risk assessment. You saw us marching down the river. When we have those river data available, we'll put that together with the data for the fish and the game and then we'll be able to give the whole

package of what the risk assessment will include, which will be not just the dioxins and furans but, of course, any other contaminants of concern that emerge in that review.

AUDIENCE MEMBER: So is the site specific criteria incumbent on all of the characterization of the entire river?

~~LISA YOST~~ DEB MacKENZIE-TAYLOR: The approach Dow has taken for the Tittabawassee River is to do a forward looking risk assessment first and then identify for which pathway site specific criteria needs to be developed. It's a multistep process is the approach they're taking with the screening level risk assessment first to eliminate exposure pathways and contaminants of concern and then a forward looking risk assessment to fine tune it a little more and then eventually if there's risk for some exposure pathways, such as fish consumption, there would need to be criteria developed.

DEB MacKENZIE-TAYLOR: Are you asking about Midland specifically?

AUDIENCE MEMBER: No. I'm asking about the Tittabawassee River.

DEB MacKENZIE-TAYLOR: With Midland, there was a direct contact criteria report submitted last

year toward the end of the year and the State was ready to move forward with an independent Science Advisory Panel review of that. That was held up with regard to funding of the review, and a series of meetings were begun to talk about a presumptive remedy for the City of Midland and that process has been stalled out for a few months now.

AUDIENCE MEMBER: What's the funding argument or disagreement or whatever?

DEB MacKENZIE-TAYLOR: It was the State's understanding that Dow was going to be pay for an Independent Science Advisory Panel review of a direct contact criteria report and we were going to have an independent organization conduct -- set up the panel and conduct that review. Dow wanted to be involved in what the questions were for the panel and who was going to be on the panel and we told them that they could recommend questions and they could recommend panel members but that the final questions would be a decision made by this independent coordinator and that wasn't acceptable to them so the funding was not provided.

AUDIENCE MEMBER: But it wouldn't be an independent review if Dow gave the questions that had to be asked, am I correct?

DEB MacKENZIE-TAYLOR: We were concerned that the charge questions should not -- I mean, we said that they were able to recommend questions but the final decision on what questions would be the independent coordinator's.

AUDIENCE MEMBER: So is there any end in sight for this?

LISA YOST: Can I speak to one part of that? You're correct, if either entity had said, this is exactly what you'll address and you'll address nothing else, then it wouldn't be independent. The whole idea is to bring in nationally recognized experts and let them use their judgment in addressing the areas where there's controversy or uncertainty and I think both parties believe that is the appropriate way to do it. That's how it's done in other sites.

It is very typical for both the responsible party and the regulatory agency to have a joint role in identifying where do we disagree or what are our issues and then bring in the experts to say what's the science tell us. As Dr. Garabrant was saying, what does the data tell us, what's the body of evidence to answer these questions. So it is typically a joint process and that I think at the moment is where the controversy is in terms of how to move forward on the

outside review of the direct contact criteria.

GREG COCHRAN: I'd like to address Michelle's question about funding. Funding was never a concern. We never really got down to the heart of the matter of who pays for what. We got bogged down much sooner than that in who charters this panel, who selects the panel, who directs the panel, okay, and as Lisa just pointed out, typically, on a corrective action site, that's done jointly between the regulator and the regulatee. In this case it's our understanding, and Deb can correct me if I'm wrong, but in this case it was very clear that the State wanted to do that solely. Yes, it would consider recommendations from Dow but they wouldn't consider a co-sponsorship of that panel.

AUDIENCE MEMBER: I still think that wouldn't be independent as the responsible party, Greg, for you folks to be in on that, but that aside, was that the TERA Group?

DEB MacKENZIE-TAYLOR: Yes. It was the TERA Group.

AUDIENCE MEMBER: See, I thought everybody had agreed on -- looking back on minutes and notes and different things, I thought everybody was on the same page with this TERA Group.

DEB MacKENZIE-TAYLOR: We thought so, too, but that's --

AUDIENCE MEMBER: Okay. Thank you.

CHUCK NELSON: Dow, do you have anything to add or not?

GREG COCHRAN: Yes, I do. Michelle, it was never about whether it was TERA or any other Independent Science Advisory Panel. That was never the issue. It wasn't a Dow refusal to use TERA at all.

CHUCK NELSON: Okay. Sir, you're next.

DR. SHAHEEN: I've been coming to these meetings for a long, long time and I haven't spoken lately. I'm Dr. Shaheen. I've practiced in this area for 50 years. We talk about billions and trillions. I don't think anybody knows what a trillion is. First of all, I'd like to know -- I've been researching this and studying it for a long, long time. I'd like to find someone that I could directly say or you can directly say has gotten sick from the dioxins or furans in the river and I've been looking and looking for years. I've discussed it with scientists. You talked about bringing experts in. We brought Dr. Birnbaum early on. She came and she's an expert on dioxins and she says there's no harm. She says no

one can get hurt from the dioxins.

And the way this keeps going on and on and spending money and causing economic damage to an honorable company that's trying to please everybody and you can't please everybody. It's impossible. The only thing that will cure dioxins is sunshine, air and wind, and the more you disturb it, it's like manure. The best thing to do is to aerate it. I mean, if you want to do anything, put some aeration equipment in the river and aerate it and that takes care of the dioxins over a period of time. As everybody has said here, it's going down and down and we keep talking about the same thing over and over and over and God knows how long this is going to continue.

I mean, we've gotten rid of General Motors. I mean, they're not here anymore. I mean, they don't have to be in Saginaw. Dow doesn't have to be in Midland and that's what's going to happen and that's what we're doing and so I want some proof. I've been looking and I want somebody to tell me anyone who's gotten sick from dioxins, directly sick that can be proven, and I know you, too.

AUDIENCE MEMBER: Sam.

CHUCK NELSON: Hang on just a second.

AUDIENCE MEMBER: No. I want him to --

CHUCK NELSON: Let me just finish. Sir, are you done?

AUDIENCE MEMBER: Yes.

CHUCK NELSON: Okay. Have a seat. Ma'am, you're next.

AUDIENCE MEMBER: No. Sam, I want to talk to you. You came to see Herb, my husband, on the Saturday night before he died. Herb's dioxin levels were taken the Thursday before he died. They were very, very high. Where would another Doctor get dioxin levels in his blood stream, except we've lived on the river for 40 years. We played on the river flats with our motorcycles, with walking, with everything. We had trails there. We can't use them anymore. So he was the 1 in 100,000 people that died.

DR. SHAHEEN: How has that been proven?

AUDIENCE MEMBER: He had no cancer in his family. Heart attacks, no cancer. His dioxin levels were taken the Thursday before he died on a Sunday and they were very high. Why would they be high? You knew him and he died. So that's my answer. He is the one person that you knew that died.

CHUCK NELSON: Other comments or questions?

AUDIENCE MEMBER: I would like to maybe suggest, Dr. Shaheen, that you may want to personally

talk to Dr. Aquilina, Joseph Aquilina.

DR. SHAHEEN: Oh, I know him very well.

AUDIENCE MEMBER: You might want to maybe have a conversation with him in regards to what he perceives as a problem with cancers and perhaps being caused by dioxins.

CHUCK NELSON: Other comments or questions? Now hang on. John has got you beat there, Terry.

AUDIENCE MEMBER: Hi, Chuck. John Witzke from Michigan United Conservation Club. Dr. Shaheen, I wish you would have worked at the plant for 35, 40 years. A lot of my good friends have left us due to cancer from benzene asbestos. I myself had 60 percent of my liver taken out. Vinyl chloride was the culprit. Vinyl chloride attacks either the liver or the brain. We decided to bring suit, but in order to have a successful campaign, we had to include all the vinyl chloride manufacturers but Dow was the one that paid the most and decided not to contest it in Court. Thank you, Doctor, and I wish you knew what the hell you were talking about.

CHUCK NELSON: The one comment that we have talked about, staying respectful, John, and I would appreciate that you would keep thinking about that. I realize this is a very important issue for everybody

in the room. Other comments or questions?

AUDIENCE MEMBER: Okay. This is another science question, my last question tonight I believe. I'd like to say that I'm a fan of the University of Michigan. I've had many friends that have attended the University of Michigan. I know Professors at the University of Michigan. This is the first time tonight, however, that I've heard the word University of Michigan in a way that suppresses science and it really was bothersome to hear Dr. Garabrant tonight suggest that it wasn't necessary for the State to see the raw data from the University of Michigan study. It's good enough to invoke the name of the University of Michigan. I don't think that's science and I would ask the Dow Chemical Company to direct its client, Dr. Garabrant, to release the raw data to the State so that they can have some oversight and that's what science is about anyway. It's not supposed to be proprietary. It's supposed to be shared. It's supposed to be made available so that it can be examined and I would like a response from Dow.

JOHN MUSSER: I'm just going to speak to one point, Terry, you made a statement that is not accurate. Dr. Garabrant is not our client, nor are we his. We provided an unrestricted grant to the

University of Michigan to conduct a study. That was the beginning, the middle, and the end of our relationship with that study. We don't have any ability to direct Dr. Garabrant to undertake assessments or not to undertake assessments or to divulge information or not divulge information. It's their responsibility to manage their information with their study in a way that they consider to be ethical and transparent.

AUDIENCE MEMBER: Well, I had to try, John, because I've been attending these meetings, as you know, and as you've been, on a fairly regular basis, and at almost every meeting, I have raised the same issue of sharing this information with the State so we can have some understanding of what the basis is for Dr. Garabrant's conclusions and so that we can feel more comfortable with the data but there seems to be a real reluctance on Dr. Garabrant's part to share this data with the State or for that matter with EPA presumably.

JOHN MUSSER: Well, I'll let Dr. Garabrant defend his own research and his agreement or not to give out the information on the study.

AUDIENCE MEMBER: Thank you.

DR. DAVID GARABRANT: Terry, you've

misrepresented a number of facts. First off, there's nothing I would like better than to put the raw data on our website because there's nothing to hide. I would welcome EPA, the State of Michigan, and you to analyze the data anyway you like. However, when we collected the data, when we went to people in the community, we promised them confidentiality. We said, if you participate in our study, we will protect the fact of your participation and we will protect your individual data. I had a Human Subject Ethics Board review that and approve that. I cannot violate that promise. I simply cannot. That's the way the data were collected and they have to stay that way.

We have set up mechanisms to ensure that the data is being analyzed properly. The first is, we have an independent Scientific Advisory Board, and as you well know, we report to the SAB. We don't report to Dow. In fact, Dow gets nothing from us other than what is presented in public and put on our website. Our SAB is chaired by Linda Birnbaum. The other members are Ron Hites at the University of Indiana, Paolo Boffetta at IARC in France and Marie Sweeney at NIOSH. They have seen the raw data. They can see anything they want. They do see it and they review everything we analyze.

A second mechanism we have set up, we ask for stakeholders to tell us what they would like analyzed, and if you've been on our website, you are aware now that there is a long list of stakeholder requests for analyses. We've had many from MDCH, MDEQ where they've said, would you look at this. We do those analyses. We put the results on the website. We review them with the stakeholder who requests them. We have set up mechanisms that allow the data to be scrutinized and reviewed by an independent scientific body and we have a mechanism whereby you can query the data and our SAB gets to look at what you've asked for and how to respond to it and to comment on it, and if I could share the raw data, I'd put it on the web, but I cannot for ethical reasons.

AUDIENCE MEMBER: I would ask the State to respond to Dr. Garabrant. Are you comfortable with the access that you have? It would seem as though that --

DEB MacKENZIE-TAYLOR: For the most part. Part of the issue, Terry, is, you know, yes, there are a lot of questions we have. There are only so many hours in the day for all of the issues we need to address and that isn't one of our main focuses because it's not directly related to the corrective action

work that we have to do everyday. So we don't have a lot of extra time to put questions together. We do have questions we'd like to ask. In fact, Kory and I were talking today about some questions we had, wanted to start getting our list together. We were talking about some questions we have but we just haven't had a lot of time to follow through with that and I apologize for that.

I think that U of M has been responding to our questions, sometimes, you know, maybe not as quick as you'd like and sometimes maybe not as quick as we'd like, but as Dr. Garabrant said, they like to pose them to their Science Advisory Board and have them see the results I think before they provide them back to us, so that takes some time. We do have some concerns and some things that have come up at some of the stakeholder's panels with the Science Advisory Board about whether the study really included enough people that had elevated soil levels.

One of the things that we've discussed with you before and one of the questions we asked was exactly how many participants had soil concentrations over 1,000 parts per trillion and I believe the answer was 17 or something in that -- 14 to 17, I'm not exactly sure because we couldn't get a real direct answer on

that, but somewhere between 14 and 17 out of 1,300 or 946 with blood levels. So we do have some concerns.

Another concern we have is how well represented fish consumers, especially high-end fish consumers, are and how well represented high-end wild game consumers from the area are and those are some things we've brought up with the Science Advisory Board and they've made some recommendations on maybe some follow up studies along those lines. I don't know if they're going to be pursued or not but those are some of the discussions that have been had during the Science Advisory Board panel meetings.

CHUCK NELSON: Let's let Linda from MDCH, you've got a comment, too.

LINDA DYKEMA: Terry, I'd like to just add one point, assuming you can see me over this, if there's anything that we're in agreement on is that human blood data taken in confidence needs to stay in confidence and I wouldn't ask Dr. Garabrant to reveal that information to us. In the same way, if I had information about blood levels of people who live on Riverside Boulevard, I wouldn't be able to share that as well. So that information taken in confidence under a confidentiality agreement has to stay that way and there's just no other way that that can happen.

CHUCK NELSON: Dr. Garabrant, you got another comment.

DR. DAVID GARABRANT: Linda, I appreciate your support. Thank you. We are trying very hard to be responsive to your concerns and your questions. It does take time. Our SAB does have to review it. I deeply and sincerely appreciate that you recognize that. Terry, I would say, if you are interested in what our data has to say, we've invited Michelle, we've invited Lone Tree to every one of our SAB meetings. Lone Tree is welcome to attend. I haven't seen Lone Tree in a long time.

AUDIENCE MEMBER: We have to work during the week, Dr. Garabrant. We have jobs.

DR. DAVID GARABRANT: I do, too.

AUDIENCE MEMBER: But that's your job and I appreciate --

DR. DAVID GARABRANT: But if this matters and if you want to know what the data are and what the results are, you've got to attend.

AUDIENCE MEMBER: We got to make a living.

CHUCK NELSON: Terry.

AUDIENCE MEMBER: Can I hear what EPA has to say about this?

CHUCK NELSON: Yes, you can. What I want to

make sure is that other folks who haven't spoken yet tonight get a chance, but, yes, if EPA has a comment, you're welcome, and then I just want to make sure there might be some other folks that might have comments. I don't mean to cut you off. I want to make sure they get their say.

MARIO MANGINO: Mario Mangino, EPA Region 5. We understand the confidentiality issue and I don't think that's worth arguing much more over. We have reviewed parts of the study. We understand there's a lot of power in the study. It's very well designed for what it does, which is a look at a randomly selected population, as Dr. Garabrant has stated many times. We have some of the same concerns about the study not being directed at potentially highly exposed persons who may live on highly contaminated properties, as we've discussed tonight, and other persons who may be at a more higher level of exposure because of their behavior, such as high-end fish consumers and high-end hunters, and we should keep in mind that, although blood study data is being collected for comparison to soil exposures, this is not a health study. It's not a health effect study and we should all be very careful not to try to extrapolate health effect study information and

conclusions from this study.

Otherwise, EPA does feel the study has usefulness, but some of the correlations being discussed about soil exposure and serum levels, we understand that those are firm conclusions that David has and we understand how he's deriving those. I also think the study has some other powerful conclusions about exposure of persons living in the floodplain and persons living in the referenced area. David has shown us those powerful conclusions which would be I think important to people living in this area to show the potential for elevated exposure of persons living in the floodplain compared to the referenced persons, and I'm talking about David's TCDD data that he's shown us that I don't believe appears on the website yet or in publication. So there are other potentially important and useful conclusions that this study I think has found and may show to find with further analysis that I think would be important and that's why we look forward to a final report on the study. That's what EPA would like to see.

We understand the University's desire to put out peer review publications as a recognition of their work, but as far as public consumption, it's going to be very hard for the public to distill their way

through a lot of very technical publications. So what the EPA looks forward to is a final report designed in a way that the public can understand methodology and understand conclusions and we'll go over some of these other kinds of results of the study that I think would be important to the public.

CHUCK NELSON: Other comments from the public here, please come to a mike. I see two of you. Sir, you're first.

AUDIENCE MEMBER: My name is Doug Martin. I'm from Midland, Michigan. I heard Dr. Shaheen mention that he didn't know what one part per trillion was so I thought I'd fill him in on that first. If you take a string from the floor here up to the moon and cut out one quarter of an inch, that's one part per trillion. Also one drop into an Olympic sized swimming pool is one part per trillion. Now that doesn't sound very significant but you also mentioned that you never had a patient that died from dioxins. Well, you've never had a patient that died from lung cancer either from smoking because that's not provable either. The only thing that's provable is what Dr. Irving Seal found when he discovered mesothelioma from asbestos. That's the only cancer that you can prove scientifically.

Now if you want to go on preponderance of evidence, there's a lot of Vietnam Veterans that have been exposed to Agent Orange that are getting disabilities. This is all on preponderance of evidence, too, like non-Hodgkin's lymphoma, Hodgkin's lymphoma, soft tissue sarcomas, diabetes, and then you've got Dr. Arnold Schechter that studied the North Vietnamese that came down into South Vietnam, okay, and then these North Vietnamese went back up to North Vietnam. We did not spray North Vietnam. Now these people were inspected and tested and then you have to find out what happened to their kids. That's about it.

CHUCK NELSON: Other comments, questions?

AUDIENCE MEMBER: Dr. Garabrant said that Dow did not benefit from this study and I think they actually did benefit from the study because it seems like around the time that the results were starting to come out Dow Chemical and some of their front groups and other activists came out saying that, oh, the U of M study says there's not a problem here. The gentleman that was sitting back there with the Walleye Rocks T-shirt said while he was here up, commented that, hey, the U of M study shows there's not a problem here so why are we spending so much time on

it. That's the direct benefit that Dow Chemical got from your research.

I have been involved in a few research projects at Michigan State University quite a number of years ago. It is possible to anonymize data enough that you can end up having data that would still be meaningful but yet would still protect any kind of an agreement on confidentiality. The idea of the U of M study being a black box where a chosen few can pull out whatever information they need, especially in view of the big brass band that the Dow sympathizers were beating and playing as your study was being released, the whole black box idea really gives me -- it breeds a lot of skepticism in my mind just because of the fact that -- and I mean, I may be totally -- you may be totally above board and maybe it's just the way that you say it is, but I know that there have been plenty of research from scientists that have proven things that have been found to be either, well, bogus, somehow cooked, manufactured, bought and paid for, influenced.

Statistics is a very interesting study in itself because you can take almost any statistic and prove several different things from it and so the whole idea of this -- excuse me, I'm a little nervous, but the

whole idea behind this U of M study being some big black box really makes me think that the results from the study are almost meaningless because there are so many holes in it and there were so many other organizations from the EPA, the DEQ, and many other groups that were saying, wait a minute, we don't know the data, we don't know how they did it, we don't what people they had, we don't know if they weighted the people, we don't know if they chose specific people or specific groups of people over others, because it's entirely possible that the sample size could have been skewed with people that didn't even live on the river or didn't even consume fish.

And so at that point then, you're coming out saying, well, there's no correlation with anything. Well, of course, there wouldn't be, and you're saying and you said, well, you're coming up with all these figures on all the dusts and everything else, and while we're not seeing any kind of correlation between the dust in people's yards and what we found in their bodies, to me, the light bulb goes up in my head going, well, where the heck did you pick these people, when you've got a State toxicologist kind of getting a shocked look on her face like, wow, that's really bizarre, it goes back to the whole black box thing.

Since we don't know who you picked, we don't know how it was sampled, we don't know anything about it, we just have to trust you and the great almighty University of Michigan, you know, that's not enough for me. I'm sorry.

CHUCK NELSON: Can you let him respond here? Dr. Garabrant, do you have any response?

DR. DAVID GARABRANT: I disagree with your characterization as a black box. As I just explained, this has gone through an Institutional Review Board to be sure it's ethical. We have appointed a Scientific Advisory Committee or a Scientific Advisory Board that has access to all of the data and all of the analyses and we go over that with them twice a year. We have set up mechanisms for lay people and anyone who wishes to pose questions and ask for analyses. We invite lay people to attend our SAB meetings so they can meet with the SAB confidentiality to express concerns just like yours, is this being done honestly, is it being done properly. We've put our study protocol on the web. Everything we are doing is done according to a written protocol that is on the web and we follow it, and so if you have a question about how we selected our sample, it's in the protocol.

I resent the inference that we're not doing

honest research. We've set every possible mechanism to ensure that this research is being done to the highest scientific and ethical standards and that there is review of it at multiple levels and opportunity for feedback. I would also remind you that when we wrote the protocol we asked for stakeholder input on how to design the study. We got stakeholder input, and in fact, we redesigned the study in response to that input. That cost me and my staff the entire summer of 2004 as we reworked our questionnaire and our approach to it. I would also remind you that it was because of stakeholder requests that we expanded the area under study to include the Tittabawassee River south of the Center Road Bridge. We thought that the contaminated area of interest was above that. Stakeholders said, no, no, no, you got to go down to where the Tittabawassee and the Shiawassee meet. We did.

Now one of the results of that change in protocol was we included the floodplain on both sides of the river and that led to the inclusion of many people on the south side of the river whose property is relatively uncontaminated, okay, but that was the protocol and we have followed it. So if you want to know how we picked people, read the protocol, give me

a call and I'll discuss it with you, and we followed it and I can prove that to you. There's no question about how we selected people for our study.

AUDIENCE MEMBER: Everybody is wondering where the dioxin reassessment from the EPA is. There was a Scientific Advisory Board appointed to reassess the reassessment of the reassessment and that's why I guess at least in laymen's terms that's why that's been basically ground to a halt. From what I've been reading, it kind of proves a lot of damning things about dioxins, but anyway, back to your study, the idea that -- I mean, it's just the idea that we don't know.

The whole thing with the MSU wild game study which was also used by the bandstand to whip up the whole idea that there weren't any problems in the Saginaw area, and then somebody said, well, did you look at potentially game movement and where any of these animals migrated into or out of the area, basically making your whole study pretty much meaningless, and it was like, uhm, well, no, we really didn't look at that because it wasn't to be part of the study, so you know, you kind of have -- there's so many things you have to look at and I can understand some of the frustration from some of the groups that are looking

at the black box making requests to get information out and either being stonewalled because of, you know, realistic reasons or whatever.

But you know, I look at the U of M study and it's like, what it proves is on face value and it really doesn't have that much meaningful impact on anything going on in the area in my mind. I don't see where it has that much value but it certainly was broadcast, as per the gentleman that was here, that there's no problem here, and the lady that's here, there is a problem here.

CHUCK NELSON: Okay. Other comments here, people please go to the microphone. Now you're responding to his comment, is that correct, from a perspective of a Dow contractor?

DENISE KAY: Yes. My name is Denise Kay. I work for ENTRIX where we work on the ecological risk assessment. I'd just like to clarify that the wild game study, that's where deer, turkey, rabbits, squirrel were collected and chemicals in the tissues of those animals were measured, had nothing to do with Michigan State University. That was not a Michigan State University study. That was a study that was contracted between Dow and ENTRIX and it was in response to public questions and concern about what

might be in the tissues of the animals that they were consuming and that concern was expressed.

Dow contracted us to collect those animals and measure those concentrations. We did that study. We measured those concentrations in response to that concern, and as with most studies, once you take a first look at things, other questions come up, and the question that came up, we did find some things in those tissues and to what extent are those animals moving and to what extent might you continue to find contamination in those tissues. The first study was in 2003. A second study has now been done in 2007 which extended the area where animals were collected from to further answer that question.

In addition, as far as how far animals are roaming from the floodplain area, there have been numerous studies done on the movement of animals, the movement of deer. Any deer hunter in here knows, people look at that, people study that, and it's not an unanswered question, but it was not part of this study design, nor necessary to answer the public concern.

CHUCK NELSON: Any other comments? Sir, you haven't spoken. Go right ahead. You're first and then the gentleman in the back afterwards. We're down

to about six minutes.

AUDIENCE MEMBER: Dr. Garabrant, I'm a Wolverine, so maybe my point of view isn't quite as subjective as you would like or maybe it's more. Health isn't something that I know a lot about, so when the EPA guy said, this wasn't a health study, it's clear to the community here that there are a lot of people who look at your study as a health study, and the Dow bandstand, to use his term, clearly promoted that. What I would want to know is, are you aware of that and what do you feel about that?

DR. DAVID GARABRANT: We have said repeatedly, the University of Michigan study is not a health study. It is not a health study. We did not look at any health condition at all. It's an exposure study. The central question in our study is whether the dioxins in the environment, in Midland and Saginaw, are getting into people's bodies and by what pathways. In other words, does living on contaminated soil give you a higher blood level of dioxin.

AUDIENCE MEMBER: I understand that.

DR. DAVID GARABRANT: It's an exposure pathway study. It's not a health study and we've been unambiguous about that.

AUDIENCE MEMBER: But clearly, in the

community, people see it that way, and I want to know what your feeling is about your study being misused, and if the corporation or the bandstanders are misusing it, personally, what do you think about that?

DR. DAVID GARABRANT: I do not like it when anyone makes misstatements about our study. We're trying to do something that's very tightly defined. We've been very careful in how we've written the results and how we talk about them, and when people claim that it's not being done right or claim that it proves something it doesn't prove, I disagree with them and I wish they would not do that.

AUDIENCE MEMBER: But isn't it perhaps a part of the ball game when you realize where the money for the funding comes from that you are likely to be used in this method? I mean, were you naive going in that you just didn't think this would happen?

DR. DAVID GARABRANT: When I --

AUDIENCE MEMBER: Well, actually, you don't have to answer that. That's a personal question for you to think about. If you want to, that's fine.

DR. DAVID GARABRANT: I've thought about it.

AUDIENCE MEMBER: And I'm done.

DR. DAVID GARABRANT: I thought about it a long time ago. When I decided to take this on, the

question in my mind was, can I do this honestly, can I do this to the standards of integrity that I work at, and in order to take it on, I wanted an independent Scientific Advisory Board. I wanted an IRB to review the ethics of how we used human subjects in research. I wanted transparency. I wanted stakeholder input. I wanted to put everything on a website. I have. Okay.

We've done this study, my colleagues and I, the way we think it should be done. We have not had anybody tell us how it ought to be done. We have not had anybody tell us how to interpret our data, and if we did, we would not take their counsel on those points. I'm happy to listen to points but we get to write it the way we see it. It's honest research done to the highest standards of integrity and it's reported out absolutely honestly. It could have turned out very badly for Dow. That's the way it goes. They didn't set up a mechanism, nor would we have agreed to one, that would have allowed them to have any way to change or edit or suppress the results, no matter what we found.

CHUCK NELSON: Sir, go ahead.

AUDIENCE MEMBER: Thank you. My son also has a Doctorate from U of M, but what I'd like to say is that I have tapped my maple trees over the years

and made my own maple syrup. I had two kinds of bees, midnight bees and Italian bees, and I ate the honey from them for years, but my bees have all disappeared, and then I trapped the river for years and the muskrats disappeared, the beaver disappeared, and those are things that I did eat right up until they disappeared, and raccoon, but I still have raccoon, but the things that spent time in the water, they're gone. They didn't reproduce anymore and those are the things that, you know, bother me. The bees are gone.

The lake is all filled in. Now it has a yellow film on top of it and that was the only natural lake in Saginaw County. The bees are gone. I don't know. If that's progress, I guess that's progress, but they checked the nuns at the convent for blood tests for Dow -- or for dioxins I should say, excuse me, and they skipped me, so I don't know.

CHUCK NELSON: Okay. We are at 9:00. This has been a spirited meeting. I appreciate your attendance here. I would ask you to note that the next scheduled community meeting is November the 6th I believe in this same room at the same time, starting at 6:30. Presenters and other appropriate parties will be here at 6:00 to answer questions and spend time with you. I would have you note that Dow, DEQ,

the Department of Community Health, the EPA all will be here to talk with you, show you data and information they have, and spend time with you. So please take advantage of this opportunity to follow up with any additional questions you have. Thank you and drive home safely.

(Meeting concluded at 9:02 p.m.)

STATE OF MICHIGAN)
)
COUNTY OF SAGINAW)

I certify that this transcript, consisting of 103 pages, is a complete, true, and correct transcript of the proceedings and testimony taken in this case on August 7, 2008.

I also certify that I am not a relative or employee of or an attorney for a party; or a relative or employee of an attorney for a party; or financially interested in the action.

August 18, 2008

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Natalie A. Gilbert, CSR-4607, RPR
Notary Public, Saginaw County, MI
My Commission Expires: 8-10-2013